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United States Government Accountability Office  
Washington, DC 20548

September 28, 2009

The Honorable Neil Abercrombie  
Chairman  
The Honorable Roscoe Bartlett  
Ranking Member  
Subcommittee on Air and Land Forces  
Committee on Armed Services  
House of Representatives

Subject: *Defense Acquisitions: Army Aviation Modernization Has Benefited from Increased Funding but Several Challenges Need to Be Addressed*

The Army's current efforts to transform and modernize its aviation assets began in 1999, seeking to maintain and improve the warfighting capabilities of the existing force as well as to invest in science and technology in a way that improved the future force. To accomplish these goals, the Army focused on upgrading and modernizing existing equipment, rapidly fielding new equipment, incorporating new technologies as they became available, and restructuring aviation warfighting units. Initially, fielding the developmental Comanche helicopter was a key focus of modernization, but when the Comanche program was terminated in 2004, an investment strategy was presented to Congress that would redistribute \$14.6 billion of planned Comanche funding through fiscal year 2011 to enhance a broad range of Army aviation modernization efforts. Furthermore, the Army is currently re-evaluating the plans that were established in 2004 by conducting several assessments, tracking progress, and assessing future capability requirements, and intends to develop an updated Aviation Modernization Plan in 2010.

Given this, you asked us to determine:

- What is the Army's current investment strategy for its aviation forces?
- How do the current aviation plans differ from the initial post-Comanche plans and what are the causes of the differences?<sup>1</sup>
- What challenges does the current investment strategy face?

To address these objectives, we conducted our work at the Department of Defense (DOD), Department of Army, Program Executive Office Aviation, Program Executive Office Missiles and Space, and selected aviation and missile program offices, holding discussions and interviews with appropriate DOD and Army officials. For each question, we compared army aviation acquisition plans, analyzed investment data

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<sup>1</sup>Initial post-Comanche plans were established after the Comanche termination in 2004.

Report Documentation Page				Form Approved OMB No. 0704-0188	
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1. REPORT DATE <b>28 SEP 2009</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2009 to 00-00-2009</b>	
4. TITLE AND SUBTITLE <b>Defense Acquisitions: Army Aviation Modernization Has Benefited from Increased Funding but Several Challenges Need to Be Addressed</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Government Accountability Office, 441 G Street NW, Washington, DC, 20548</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>49</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

from DOD and the Army, and identified and recognized possible execution risks in the Army plans over the coming years.

On August 13, 2009, we briefed your staff on our initial observations related to the Army's current aviation modernization strategy and the challenges it faces. This report transmits the materials we used at the briefing, which are reprinted in enclosure I.

We conducted this audit from November 2008 through September 2009 in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

## **Summary**

The current Army aviation modernization plan, as proposed through fiscal year 2010, includes a combination of procuring and upgrading existing aviation systems, developing new systems, and buying off-the-shelf equipment. Existing aviation systems include the Apache, Blackhawk, Chinook, and Kiowa Warrior helicopters. New aviation systems include the Joint Air-to-Ground Missile and Sky Warrior unmanned aerial system. Off-the-shelf programs include the Light Utility Helicopter and Raven unmanned aerial system. Of the \$5.8 billion requested by the Army for aviation investments in fiscal year 2010, the majority—71.1 percent—is for existing aviation programs. Development programs account for 11.0 percent and off-the-shelf programs, 6.3 percent.<sup>2</sup> Existing aviation programs are generally meeting their cost and schedule goals, as are off-the-shelf programs. However, the new development programs have either been delayed or are just starting up.

While aviation plans continue to be dominated by investments in existing and off-the-shelf programs, the Army spent considerably more on aviation in recent years than originally planned, yet terminated new development programs. For fiscal years 2006 through 2010, actual spending was about \$30.8 billion—including base budget and supplemental funds—considerably more than the Army's original target of \$21.6 billion (in fiscal year 2010 dollars). Major increases in funding occurred in several programs: Apache upgrades and procurement, unmanned aerial system procurement, Chinook and Blackhawk procurement, Hellfire missiles, and Aircraft Survivability Equipment. A sizable portion of the increased funding was for replacement aircraft and missiles that were lost or used in ongoing conflicts. Also, differences exist in several areas due to an expansion in an existing aviation program, termination of several programs planned for development, and program changes as directed by the Secretaries of Defense and Army.

Ongoing activities to modernize Army aviation are expected to continue for the next several years, but several challenges exist that will have an impact on those efforts, including managing within reasonable funding expectations, balancing demands to field equipment quickly while ensuring the maturity of the technology, and acquiring and maintaining needed aviation capabilities. For example,

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<sup>2</sup>Totals do not include supplemental requests for fiscal year 2010. The remaining 10.9 percent of aviation investments are for avionics, air traffic control, and other needs.

- *Managing within reasonable funding expectations* will require the Army to provide long-term funding to support upgrading and sustaining the Kiowa Warrior helicopter fleet, and potentially develop and procure a replacement for the Kiowa Warrior. Furthermore, the Army will need to maintain an acceptable inventory of Hellfire missiles (particularly the laser variant) until the Joint Air-to-Ground missile is available.
- *Balancing demands to field equipment quickly while ensuring the maturity of the technology* will require the Army to continue to meet current aircraft survivability needs with currently available equipment and develop follow-on survivability capabilities. Further, the Army will need to come to agreement on unmanned aerial system commonality issues with the Air Force while resolving Sky Warrior technical issues.
- *Acquiring and maintaining needed aviation capabilities* will require the Army to balance its aviation capabilities to account for the addition of unmanned aircraft systems; while many new unmanned aircraft systems have been fielded, there have been no reductions in manned aircraft. Further, the Army will need to optimize teaming between unmanned aircraft, ground forces, and manned aircraft.

## Conclusions

Army aviation has not faced funding shortfalls since embarking on the post-Comanche plan; in fact, Army funding for aviation has increased by about 40 percent. The Army has been relying largely on existing aviation programs and off-the-shelf programs while several new development programs have experienced cost, schedule, and performance problems resulting in termination over the last few years. Cost and technical challenges in developing and fielding aircraft and missiles, if not addressed, may result in gaps between desired capabilities and available resources. Given the growth in aviation funding to date, it would not be reasonable to expect an increase in funds as a solution to cost and technical problems.

## Recommendation

To address various challenges, we recommend the Secretary of the Army ensure that the 2010 Army Aviation Modernization Strategy include

- An assessment of the impact of potentially available funding levels and sources on the ongoing and planned aviation programs, and how the Army will maximize capabilities within these constraints,
- Specifics on how the Army intends to balance demands to field aviation equipment quickly while ensuring that the technology is mature, and to apply lessons learned in its new development programs, and
- An assessment of the feasibility of acquiring and employing future aviation capabilities—such as the Joint Future Theatre Lift aircraft—as well as manage the mix of manned and unmanned capabilities over the long term.

## Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD concurred with our recommendations. DOD's comments appear in enclosure II.

In its comments, DOD noted that of the \$9.1 billion GAO identified in its report, \$8.0 billion of that amount is primarily due to supplemental requests, DOD reprogrammings, and congressional funding above the department's request. DOD stated that plans for the Kiowa Warrior are fully funded in fiscal year 2010 and the Chinook and Blackhawk upgrades are funded acquisition programs to improve the capabilities of those aircraft.

We were unable to verify the \$8.0 billion identified by the department; our report notes the actual spending through fiscal year 2009 includes \$4.0 billion in supplemental funding. Additionally, we acknowledge in our report several additional drivers of the increased funding including DOD program changes and Apache Block III development effort.

DOD stated that the Army Aviation Strategy is a discrete document that is prepared, approved, and presented as a standalone product. DOD noted, however, that the strategy is not fully linked to the Army aviation budget planning that is contained in Army aviation accounts in the annual budget submission. DOD further stated that the complete documentation that is submitted in support of the President's budget request is the department's formal plan; the strategy may include elements of a comprehensive strategy that were not funded, totally or partially, in the process of reconciling competing requirements to a constrained budget.

While we understand the role of the DOD budget, we see value in an overall Army Aviation Modernization Strategy. We look forward to both the strategy and budget submission to determine how DOD and the Army address the challenges noted in our report.

DOD also provided technical comments, which we have incorporated, as appropriate.

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We are sending copies of this report to the Secretaries of Defense and the Army as well as to other interested parties. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report.

If you have questions or need additional information, please contact me at (202) 512-4841 or [martinb@gao.gov](mailto:martinb@gao.gov). Key contributors to this report were William Graveline, Assistant Director; Michael Hesse; Anne-Marie Lasowski; Wendy Smythe; Marie Ahearn; Hai Tran; and Robert Swierczek.

Sincerely yours,



Belva M. Martin  
Acting Director,  
Acquisition and Sourcing Management

Enclosures



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# **Army Aviation Modernization**

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**Briefing to  
House Committee on Armed Services  
Air and Land Forces Subcommittee  
August 13, 2009**

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## Overview

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- Objectives
  - Background
  - Objective 1: Current Army Aviation Investment Strategy
  - Objective 2: Causes of Differences
  - Objective 3: Future Challenges
  - Observations
  - Scope and Methodology
  - Appendix I
-



## Objectives of Our Review

- As requested, we addressed the following key questions:
  - What is the Army's current investment strategy for its aviation forces?
  - How do the current aviation plans differ from the initial post Comanche plans and what are the causes of the differences?<sup>1</sup>
  - What challenges does the current investment strategy face?

<sup>1</sup>Initial post-Comanche plans were established after the Comanche termination in 2004.



**Background**



## **Army Transformation**

- In 1999, the Army began developing and implementing transformation and modernization efforts, including investments in existing aviation assets and fielding of the developmental Comanche helicopter.
- The Army's modernization of aviation assets consists of two parts:
  - Maintaining and improving essential warfighting capabilities of the existing force through modernization and recapitalization, and
  - Investing in science and technology to enable fielding to the future force.
- Furthermore, aviation modernization efforts focus on
  - Rapid fielding of new equipment,
  - Upgrading and modernizing existing equipment,
  - Incorporating new technologies as they become available, and
  - Restructuring aviation warfighting units into Combat Aviation Brigades that are modular, capable, lethal, tailorable, and sustainable.

**Background**



## **Comanche Termination**

- In February 2004, the Comanche program was terminated and funds were redistributed to meet mission needs.
- Army aviation study identified a variety of issues that needed to be addressed in order to “fix” Army aviation.
- The Army presented an investment strategy to Congress which incorporated the planned Comanche funding that would
  - Enhance modernization efforts, and
  - Work toward a more deployable, modular, and joint force structure.
- The strategy enabled the Army’s modernization efforts.
  - The Army aviation portfolio included the Apache, Blackhawk, Chinook, Armed Reconnaissance, and Light Utility helicopters; the Joint Cargo Aircraft; Raven unmanned aerial system (UAS), MQ-1C Extended Range Multi-Purpose UAS (Sky Warrior), and Shadow UAS; and the Joint Common and Hellfire missiles.
  - The portfolio also included aircraft survivability equipment, missiles systems, and other aviation support.

**Background**



## **Re-evaluation of 2004 Plans and Army Aviation Portfolio**

- The Army is currently re-evaluating the plans established in 2004 through several assessments, tracking progress in modernizing aviation, and assessing future capability requirements.
  - Army Aviation Study II
    - Review of findings of 2004 Aviation Study
    - Review of future helicopter needs
    - Consider roles of unmanned aviation systems
  - Future Vertical Lift Capabilities Based Assessment
    - Consider a variety of airlift issues, including Joint Future Theatre Lift capabilities
  - Quadrennial Defense Review
    - Look at strategies and programs, including those in the Army Aviation arena

Objective One



## What Is the Army's Current Investment Strategy for Its Aviation Forces?

- The Army Aviation Modernization Plan describes aviation missions and available capabilities while discussing planned aviation developments and acquisitions.
- The 2010 strategy includes a combination of procuring and upgrading existing systems, developing new systems, and buying off-the-shelf equipment.<sup>2</sup>
  - **Existing programs**—Apache, Blackhawk, Chinook, and Kiowa Warrior helicopters; Shadow UAS; Aircraft Survivability Equipment (ASE); and Hellfire missile
  - **Off-the-shelf programs**—Light Utility Helicopter (LUH) and Raven UAS
  - **New development programs**—Joint Air-to-Ground Missile (JAGM), and Sky Warrior UAS are already underway; Armed Aerial Scout system to start in the future.

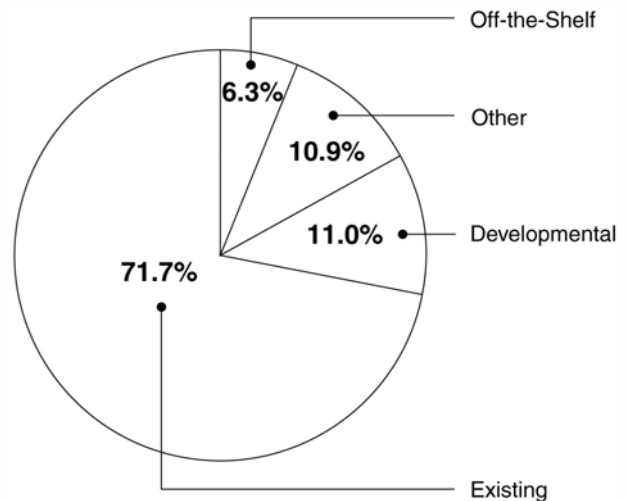
<sup>2</sup>Appendix I describes the programs and provides information on quantities and costs.

Objective One



## Composition of the Army's Fiscal Year 2010 Aviation Investment Strategy

- Of the \$5.8 billion in fiscal year 2010 investments in the Army aviation portfolio, existing aircraft programs make up about 71.7 percent.
- New programs (development, 11.0 percent and off-the-shelf, 6.3 percent) account for 17.3 percent of the total portfolio with most spending being directed to developmental programs.
- Other spending in aviation is 10.9 percent and includes avionics, air traffic control, aircraft ground support equipment, and aircraft components.<sup>3</sup>



Source: GAO analysis of Army data.

<sup>3</sup>Totals do not include supplemental requests for fiscal year 2010.

**Objective One**



## **Status of 2010 Army Aviation Programs**

- Programs to procure and/or upgrade existing aircraft are generally meeting their cost and performance goals.
- Off-the-shelf programs
  - LUH and Raven are generally meeting their cost and performance goals.
- New development programs
  - JAGM is early in its development,
  - Delays in fielding Sky Warrior program of record, and
  - Armed Aerial Scout development program expected to start in the future.



**Objective Two**

## **How Do the 2010 Plans Differ from the Initial Post-Comanche Plans and What Are the Causes?**

- While similarities exist between the Army's current and initial post-Comanche plans in terms of investments in existing aircraft and off-the-shelf programs, key differences have occurred in the portfolio.
- Furthermore, the Army has spent considerably more on Aviation in recent years than originally planned.
- Contributing causes for differences in the plans include
  - Expansion in scope of the program to further upgrade the Apache helicopter,
  - Termination of new development programs such as Armed Reconnaissance Helicopter, Joint Common Missile, Advanced Precision Kill Weapon System, and
  - Program changes as directed by the Secretary of Defense and Army.

## Objective Two



# Aviation Portfolio Similarities and Differences

	Aviation programs	Initial post-Comanche aviation modernization plans	Current aviation modernization plans
Existing aircraft programs	Apache	X	X
	Blackhawk	X	X
	Chinook	X	X
	Kiowa Warrior	Upgrades to system not included	X
	Shadow	X	X
	ATIRCM/CMWS	X	ATIRCM program being restructured
	Hellfire	Additional procurement not included	X
Developmental	ARH	X	ARH terminated (Replacement being studied)
	JCM	X	
	JAGM		X
	Sky Warrior	X	X
	APKWS	X	APKWS Terminated (No current replacement)
Off-the-shelf	JCA	X	Transferred to Air Force
	LUH	X	X
	Raven	X	X

Source: GAO analysis of Army data.  
Note: "X" denotes systems included in the plan.



**Objective Two**



## **Causes of Differences—Increased Spending for Aviation**

- Overall, the Army has and will continue to spend more resources annually to modernize aviation than it had planned to do after the termination of Comanche.
- For fiscal years 2006 through 2010, the Army planned to spend \$21.6 billion on aviation modernization.
- Actual and planned spending for those years was about \$30.8 billion, including base budget and supplemental funds.
- Major increases in funding occurred in these areas:
  - Apache upgrades and procurement as well as Block III development
  - UAS procurement
  - Chinook and Blackhawk procurement
  - Hellfire missiles
  - Aircraft Survivability Equipment
- Actual spending through fiscal year 2009 includes at least \$4.0 billion in supplemental funding used for war replacement purposes.

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## Objective Two



## Causes of Differences—Spending for Fiscal Years 2006-2010

	Initial Post-Comanche Plans for 2006 - 2010	Actual and Current Aviation Plans for 2006 - 2010	
UAS (Includes Raven, Shadow, and Sky Warrior)	907.0	4,084.1	3,177.1
Apache	4,225.9	6,370.7	2,144.8
Chinook	4,652.9	6,100.2	1,447.3
Blackhawk	5,106.7	6,519.8	1,413.1
ASE	1,866.0	3,143.6	1,277.6
Kiowa Warrior	113.0	658.1	545.1
LUH	916.2	1,083.4	167.2
JCA	614.0	518.7	(95.3)
Munitions (Includes APKWS, JCM, JAGM and Hellfire)	1,380.0	1,232.9	(147.1)
ARH	1,844.8	1,047.3	(797.5)
<b>Totals</b>	<b>21,626.4</b>	<b>30,758.7</b>	<b>9,132.4</b>

Source: GAO analysis of Army data.  
Note: Funding includes supplemental dollars.

**Objective Two**



## **Causes of Differences—Expansion of Apache Block III Development Effort**

- Originally an engineering change proposal, the Apache Block III was expanded and upgraded to an ACAT 1D program in 2006.
- Apache Block III, an upgrade to the D model, includes improved drive systems; upgraded communications; improved situational awareness, targeting, and navigation; and Level 4 UAS capability.
- A milestone C production decision is expected in April 2010 with initial capability set for January 2013.

Objective Two



## Causes of Differences—Termination of New Developmental Programs

- **Armed Reconnaissance Helicopter**—Due to cost, schedule, and performance problems, DOD terminated the program in October 2008.
- **APKWS Rocket System**—Terminated due to contractor problems with cost, schedule, and performance expectations caused by technical issues and failed testing.
- **Joint Common Missile**—Development was established in April 2004, but cancelled in December 2004 due to future capability needs.

Objective Two



## Causes of Differences—Directed Program Changes

- **Aircraft Survivability Equipment**—In September 2008, the Army authorized immediate action to equip Chinook aircraft with an ATIRCM system in quick reaction capability (QRC) configuration for wartime use.
- **Sky Warrior**—As part of the Secretary of Defense direction for a surge in intelligence assets, Army used supplemental funds to procure two QRC Sky Warrior systems, the first was fielded in July 2009 and the second will be fielded in 2010.
  - Systems are to be fielded even though they do not meet all of the key performance parameters.
  - DOD has accelerated initial fielding of Sky Warrior by about 1.5 years.
- **Joint Cargo Aircraft**—The Secretary of Defense removed all funding from the fiscal year 2010 Army budget when responsibility for the program was moved to the Air Force.

**Objective Three**



## **What Challenges Does the Current Investment Strategy Face?**

- Ongoing activities to modernize Army aviation are expected to continue for the next several years.
- However, several challenges have emerged, including
  - Managing within reasonable funding expectations,
  - Balancing demands to field equipment quickly with technology maturity, and
  - Acquiring and maintaining needed aviation capabilities.

Objective Three



## Managing Within Reasonable Funding Expectations—Armed Scout Helicopter

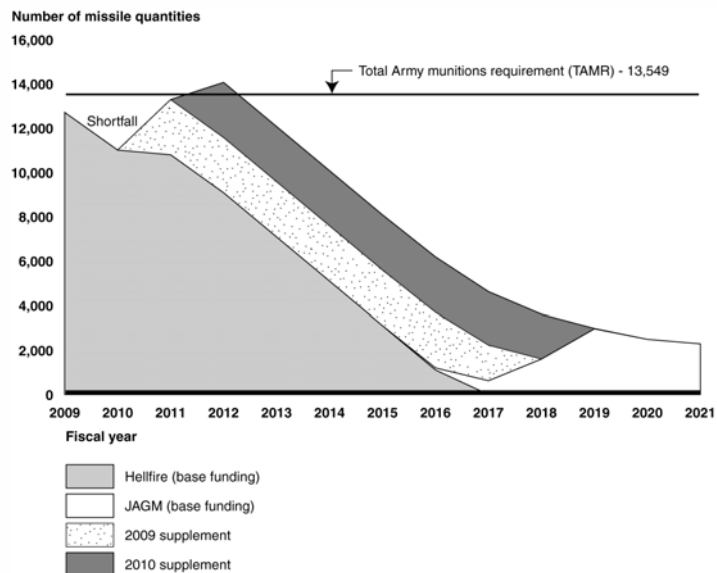
- Within the Armed Scout Helicopter program, the Army has two initiatives in place to sustain and upgrade the armed scout capabilities.
  - Upgrading and sustaining the Kiowa Warrior fleet
    - Obsolescence and weight reduction initiatives as well as completion of the safety enhancement program
    - Converting A/C models to D models
    - Upgrades including nose mounted sensor
  - Developing and procuring a new Armed Aerial Scout system that will replace the terminated ARH (which was to replace Kiowa Warrior).
    - Analysis of alternatives to be started soon.
- Both initiatives have been defined and initially approved, but not fully budgeted.
- **Challenge:** match realistic funding with scope of these two efforts.

## Objective Three



# Managing Within Reasonable Funding Expectations—Missile Procurement

- Army has expended more than 11,000 Hellfire missiles (in Iraq and Afghanistan), and plans to purchase 2,373 with supplemental funds in fiscal year 2010.
  - Unclear if Army has accounted for usage with unmanned assets in future inventory plans.
- Other than plans to replenish Hellfire missiles with fiscal years 2009 and 2010 supplemental funds, additional procurement is not currently planned in the base budget even though future needs seems to be predictable.
- Initial fielding of Joint Air-to-Ground Missile (which is to replace Hellfire) is planned for fiscal year 2016, which could result in a significant inventory shortfall prior to JAGM deliveries.
- **Challenge:** maintain an acceptable inventory of Hellfire missiles (particularly the laser variant) until JAGM is available.



Source: GAO analysis of Army data.





**Objective Three**

## **Managing Within Reasonable Funding Expectations— Supplemental Funding Resets Aircraft**

- The Army is actively “resetting” many assets in its aircraft fleet and buying new aircraft to offset wartime losses. These activities are funded through supplemental funding.
  - The Army’s reset program restores aviation equipment to a fully mission-capable condition using special technical inspection and repair procedures.
  - Total spending on reset through July 2009 for aviation platforms is \$3.5 billion.
- **Challenge:** maintain sufficient funding to continue resetting aviation equipment as they return from the warfront.



**Objective Three**

## **Balancing Demands to Field Equipment Quickly with Technology Maturity—Aircraft Survivability Equipment**

- The Army has accelerated fielding of the quick reaction capability ATIRCM/CMWS assets to meet warfighters' immediate needs while restructuring the longer term development of the ATIRCM program of record.
  - The Army is continuing to meet aircraft survivability needs by developing the quick reaction capability and adjusting the mix of flares to meet threat changes.
- The ATIRCM program is being restructured and plans to conduct a new competition with competitive prototyping once requirements and a fielding timeline has been validated through the Joint Requirements Oversight Council.
- **Challenge:** continue to meet current aircraft survivability needs with ATIRCM/CMWS and develop follow on ASE capabilities.



**Objective Three**

## **Balancing Demands to Field Equipment Quickly with Technology Maturity—Unmanned Aircraft Systems**

- In September 2007, DOD directed the Army's Sky Warrior and the Air Force's Predator programs to be more common by combining them into a single acquisition effort but that has not yet been accomplished.
- Efforts to meet urgent warfighter needs through a quick reaction capability have delayed initial production deliveries of the Sky Warrior program of record.
  - Technical issues in development of the Synthetic Aperture Radar have delayed the program of record's ability to perform as required.
- **Challenge:** finalize Air Force/Army agreement on commonality issues and resolve technical issues faced in Sky Warrior acquisition.



**Objective Three**

## **Acquiring and Maintaining Needed Aviation Capabilities—Mix of Manned and Unmanned Aircraft**

- Army has been considering how best to use unmanned aircraft to optimize teaming with ground forces and manned aircraft.
- Quantities of unmanned systems expanding:
  - Sky Warrior, Shadow, and Raven.
  - Future Combat System's unmanned aircraft may be fielded to current Army forces in the coming years.
- However, no reduction in number of manned aircraft.
- **Challenge:** optimize aviation capabilities and size of aircraft inventories.



**Objective Three**

## **Acquiring and Maintaining Needed Aviation Capabilities—Joint Future Theatre Lift**

- Enhanced capabilities attributed to Joint Future Theatre Lift (JFTL) aircraft may offer up opportunity for a new way of fighting.
  - Such as mounted vertical maneuver concept.
- Army and Air Force requirements and proposal now up for consideration by the Secretary of Defense.
  - Initial Joint Requirements Oversight Council review and possible approval expected by summer 2009.
  - JFTL acquisition may require significant resources.
- The Army requirement for JFTL may have to be reassessed in light of recent decisions on the Future Combat System program and the modernization of the brigade combat teams.
- **Challenge:** determine if there is a technically feasible and affordable means to implement mounted vertical maneuver concept and, if not, re-examine the concept.

**Objective Three**



## **Acquiring and Maintaining Needed Aviation Capabilities—Long Term Aviation Needs**

- Current “work horse” aircraft, Apache, Blackhawk, and Chinook, are seen by the Army as providing at least adequate capabilities for the next 10 years.
  - Next generation rotorcraft may not be technically feasible and affordable right now.
  - User community looking at potential capability gaps for 2015-2024 time period.
- Based on a recent Secretary of Defense decision, the Joint Cargo Aircraft was transferred to the Air Force.
  - Army may have a capability gap for the delivery of mission critical, time sensitive cargo, and key personnel to forward deployed units in the Joint Operations Area.
- **Challenge:** minimize capability gaps over the long term.



## Conclusions

- Army aviation has not faced any funding shortfalls since embarking on the post-Comanche plan; in fact, Army funding for aviation has increased by about 40 percent.
- While the Army continues to rely largely on procuring and upgrading existing systems and procuring off-the-shelf aviation systems, new development programs have experienced cost, schedule, and performance problems which often resulted in termination.
- Cost and technical challenges in developing and fielding aircraft and missiles, if not addressed, may result in gaps between desired capabilities and available resources. Given the growth in aviation funding to date, it may not be reasonable to expect an increase in funds as a solution to cost and technical problems.



## Scope and Methodology

- We conducted our work at DOD, Department of the Army, Program Executive Office Aviation, Program Executive Office Missiles and Space, and selected aviation and missile program offices.
- For each question, we analyzed investment data from DOD and the Army as well as held discussions and interviews with appropriate DOD and Army officials from the listed locations. We
  1. compared the fiscal year 2006 and 2010 Army aviation acquisition plans to determine changes over the last 5 years and determine the status of each portion of the plan,
  2. reviewed and analyzed investment strategies and data for aviation systems and conducted interviews with DOD and Army officials to determine causes of divergences from previous plans, and
  3. identified and recognized possible execution risks in the Army plans over the coming years.
- To accomplish our work, we visited the Pentagon, Arlington, Va. and Redstone Arsenal, Huntsville, Ala.





**Appendix I**

## **Appendix I—Systems Included in Current Army Aviation Portfolio**

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- AH-64 Apache
  - UH-60 Blackhawk
  - CH-47 Chinook
  - OH-58D Kiowa Warrior
  - Shadow Unmanned System
  - Aircraft Survivability Equipment
  - Hellfire Missile
  - Armed Reconnaissance Helicopter Replacement
  - Joint Air-to-Ground Missile
  - Sky Warrior Unmanned System
  - Light Utility Helicopter
  - Raven Unmanned System
-

Appendix I



## Existing Aircraft Program: Apache Helicopter Upgrades

- **System Description:** The Apache helicopter performs attack and reconnaissance missions.
- The D model upgrades add millimeter wave fire control radar, radar frequency interferometer, fire and forget radar guided missile, and digitization enhancements.
- The Apache Block III upgrades are expected to amplify performance, improve situational awareness, enhance lethality, increase survivability, and provide interoperability.
- **Army Plans:** Upgrade 618 Apache A model aircraft to Block III aircraft. Additionally, as part of the National Guard Modernization plan, Apache will also convert the remaining 95 Army National Guard A models to Block III. In fiscal year 2010, the Army plans 28 conversions and war replacement aircraft. The Apache Block III production decision is April 2010 and plans to procure 8 low rate production aircraft.

Fiscal year 2010 funding request:  
\$1.1 billion



Source: Army ATTC Office; Fort Rucker; Apache PMO.

Appendix I



## Existing Aircraft Program: Procurement of New Blackhawks and Upgrades

- **System Description:** Blackhawk provides utility and assault lift capability in support of air assault, medevac, general support, and lift helicopter.
- The M model adds a digital cockpit, upgraded engine, upgraded communications, CMWS, and wide chord blades.
- Army plans to further upgrade the M model (Mu) with fly-by-wire technology for integration with FCS, an upgraded cockpit, and a composite tail cone; Mu model will continue through fiscal year 2015.
- Blackhawk A to L conversions will extend service life and add capabilities to continue through fiscal year 2015; 38 are planned for fiscal year 2010.
- **Army Plans:** to procure 1,227 Blackhawk M aircraft. M model procurement started in 2005 and will continue through fiscal year 2012.

Fiscal year 2010 funding request:  
\$1.5 billion



Source: Army PAO.

Appendix I



## Existing Aircraft Program: Chinook D-to-F Upgrade and Procurement of New F Models

- **System Description:** The CH-47 provides transportation for tactical vehicles, artillery, engineer equipment, personnel, and logistical support equipment.
- The F model features upgraded engine, common avionics, air warrior, and digital automatic flight control.
- The Army plans to acquire 513 F models; 202 new builds and 311 remanufactured aircraft. In fiscal year 2009, 69 F models were delivered.
- **Army Plans:** Procure 31 aircraft in fiscal year 2010 with plans to continue to at least fiscal year 2017.

Fiscal year 2010 funding request:  
\$1.2 billion



Source: Redstone Arsenal, Ala.; PMO Cargo Helicopter.

Appendix I



## Existing Aircraft Program: Kiowa Warrior Life Support 2020 and A/C to D Conversions

- **System Description:** The OH-58D Kiowa Warrior is a two-seat, single-engine, observation, scout/attack helicopter that operates autonomously at standoff ranges providing armed reconnaissance, command and control, and target acquisition/designation for Apache helicopters and other airborne weapons
- Increased cost contributed by integration of nose mounted sensor results in an acquisition category II designation with the associated milestone decision cycle.
- **Army Plans:** Sustain the fleet through obsolescence and weight reduction initiatives - Kiowa Warrior Life Support 2020. Convert existing OH-58 A/C aircraft to D Models to replace combat losses. Upgrade all Kiowa Warriors with nose mounted sensor.

Fiscal year 2010 funding request:  
\$334.8 million



Source: Redstone Arsenal, Ala.; Kiowa Warrior ASH PMO.

Appendix One



## Existing Aircraft Program: Shadow UAS Product Improvement

- **System Description:** Shadow provides the tactical maneuver commander near-real-time reconnaissance, surveillance, target acquisition, and force protection during day/night and limited adverse weather conditions.
- The quantity required to equip and sustain the Army force is 115 Systems; The Army Procurement Objective is 102 and 100 have been procured to date.
- A decision to enter Engineering and Manufacturing Development was made in December 1999. A decision to begin full rate production was made in September 2002.
- **Army Plans:** Procure laser designators and retrofits of the tactical common data link which includes a ground control station as well as pre-planned product improvements.

Fiscal year 2010 funding request:  
\$609.4 million



Source: Redstone Arsenal, Ala.; Unmanned Aircraft Systems Project Office.

Appendix One



## Existing Aircraft Program: Aircraft Survivability Equipment

- **System Description:** ATIRCM/CMWS is an integrated warning and countermeasure system to enhance aircraft survivability against infrared guided threat missiles.
- A-kits are wiring and modification hardware necessary to install the B-kits, which are the mission equipment.
- ATIRCM includes an active infrared jammer and a countermeasure dispenser for flares and chaff.
- CMWS is an integrated suite of infrared countermeasures including a passive missile warning system and a countermeasure dispenser.
- CMWS has completed 1,780 A-kit and 913 B-kit installations as of January 2009. The ATIRCM program of record is not yet fielded.
- **Army Plans:** ATIRCM program restructure began April 2009 separating ATIRCM and CMWS. Subprogram next generation ATIRCM is to report back to the DAB in 60 days with a new acquisition strategy.

Fiscal year 2010 funding request:  
\$537.7 million



Source: BAE Systems.

Appendix One



## Existing Aviation Program: Hellfire Missiles

- **System Description:** Hellfire is an air-to-ground, point target, precision strike missile system designed to defeat hardpoint targets.
- Two primary variants - Hellfire II semi-active laser guidance and Longbow Hellfire millimeter wave radar guidance.
- Army has a requirement for 13,549 Hellfire missiles.
- **Army Plans:** Procure 2,373 missiles in fiscal year 2010.

Fiscal year 2010 funding request:  
\$250.9 million



Laser HELLFIRE



Longbow HELLFIRE

Source: Redstone Arsenal, Ala.; JAMS Project Office.



Appendix One



## New Start Development Program: Armed Aerial Scout

- **System Description:** The developmental ARH was to provide reconnaissance and security capability for air and ground maneuver teams and replace the aging Kiowa Warrior Helicopter.
- Due to cost, schedule, and performance problems, DOD terminated the ARH program in October 2008.
- **Army Plans:** To complete an analysis of alternatives prior to starting a program to replace the Kiowa Warrior.

Fiscal year 2010 funding request:  
\$4.3 million

Appendix One



## New Start Development Program: Joint Air-to-Ground Missile

- **System Description:** The Joint Air-to-Ground Missile (JAGM) is an air-launched missile system that provides advanced line-of-sight and beyond-line-of-sight capabilities.
- The system will be used with fixed-wing aircraft, rotary-wing aircraft, and unmanned aircraft systems.
- **Army Plans:** The JAGM is planned to replace the Army's Hellfire Missiles.

Fiscal year 2010 funding request:  
\$127.4 million



Source: Redstone Arsenal, Ala.; JAMS Project Office.

Appendix One



## New Start Development Program: Sky Warrior Unmanned Aircraft System

- **System Description:** Sky Warrior is an unmanned aircraft system that operates alone or with other platforms to perform reconnaissance, surveillance, target acquisition, and attack missions. Development began in 2005.
- Sky Warrior includes two efforts
  - the program of record, with a production decision scheduled for November 2009 and
  - two less-capable "quick reaction" systems added in response to DOD direction, the first of which is to be fielded in July 2009.
- **Army Plans:** Procure three systems with new equipment training and pre-planned product improvement.

Fiscal year 2010 funding request:  
\$651.4 million



Source: General Atomics Aeronautical Systems, Inc.

Appendix One



## Off-the-Shelf Acquisition: Light Utility Helicopter

- **System Description:** LUH is a commercially procured helicopter designed to perform a variety of missions from nongovernmental to homeland security.
- National Guard is the primary user of LUH for conducting missions in support of homeland security such as civil search and rescue and counter-drug operations.
- LUH is being procured to replace aging UH-1 and OH-58A/C aircraft. LUH will also free up Army National Guard Blackhawk assets.
- **Army Plans:** Procure 340 LUH through fiscal year 2015 and 72 aircraft have been delivered to date.

Fiscal year 2010 funding request:  
\$326.0 million



Source: Redstone Arsenal, Ala.; Utility PMO, LUH.

Appendix One



## Off-the-Shelf Acquisition: Raven UAS

- **System Description:** The RQ-11 Raven Small Unmanned Aircraft System is an “over the hill” rucksack-portable, day/night, limited adverse-weather, remotely operated, multi-sensor system used in support of combat.
- Total Army acquisition quantity procured to date 1,368 (includes 50 DDL systems). In addition, 206 system retrofits from analog to digital.
- The program entered milestone C in October 2005.
- **Army Plans:** Procure 729 additional units through fiscal year 2015.

Fiscal year 2010 funding request:  
\$79.6 million



Source: Redstone Arsenal, Ala.; Unmanned Aircraft Systems Project Office.

Enclosure II: Comments from the Department of Defense



ACQUISITION,  
TECHNOLOGY  
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3000

SEP 23 2009

Ms. Belva M. Martin  
Acting Director, Acquisition and Sourcing Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Ms. Martin:

This is the Department of Defense (DoD) response to the GAO draft report GAO-09-978R, "Defense Acquisitions: Army Aviation Modernization Has Benefited from Increased Funding but Several Challenges Need to Be Addressed," dated August 17, 2009 (GAO Code 120799).

The DoD concurs with the three recommendations. The rationale for the DoD's position is enclosed.

We appreciate the opportunity to comment on the draft report. My point of contact for this effort is Mr. Michael Walsh, 703-695-1700, [Michael.Walsh@osd.mil](mailto:Michael.Walsh@osd.mil).

Sincerely,

A handwritten signature in black ink, appearing to read "D. G. Ahern", is written over the typed name.

David G. Ahern  
Director  
Portfolio Systems Acquisition

Enclosure:  
As stated

**GAO DRAFT REPORT DATED AUGUST 17, 2009  
GAO-09-978R (GAO CODE 120799)**

**“Defense Acquisitions: Army Aviation Modernization Has Benefited from Increased Funding but Several Challenges Need to Be Addressed”**

**DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATIONS**

RECOMMENDATION 1: The GAO recommends that the Secretary of the Army ensure that the 2010 Army Modernization Strategy include an assessment of the impact of potentially changing available funding levels and sources on the ongoing and planned aviation programs, and how the Army will maximize capabilities within these constraints.

DoD RESPONSE: Concur. See comments below.

RECOMMENDATION 2: The GAO recommends that the Secretary of the Army ensure that the 2010 Army Modernization Strategy include specifics on how the Army intends to balance demands to field aviation equipment quickly while ensuring that the technology is mature, and to apply lessons learned in its new development programs.

DoD RESPONSE: Concur. See comments below.

RECOMMENDATION 3: The GAO recommends that the Secretary of the Army ensure that the 2010 Army Modernization Strategy include an assessment of the feasibility of acquiring and employing future aviation capabilities--such as the Joint Future Theatre Lift aircraft--as well as manage the mix of manned and unmanned capabilities over the long term.

DoD RESPONSE: Concur. See comments below.

DoD COMMENTS ON ALL RECOMMENDATIONS: The following comments provide relevant clarifications:

- The \$9.2B of increases in funding cited in the report, compared to original budgets for the FY 2006 to FY 2010 period, include about \$8B of supplemental funding to replace wartime aircraft losses and to purchase survivability equipment, mission equipment packages, Hellfire missiles, and other items. The remainder consists of Department-requested reprogramming actions and increases in Congressional funding above the Department request.

Attachment

- All planned efforts to improve the Army Kiowa Warrior aircraft were fully-funded in the President's Budget Request for FY 2010.
- The CH-47F and UH-60M upgrades are formal acquisition programs that included preceding, funded development efforts to improve the capabilities of those aircraft.

The three recommendations reference the "Army Aviation Strategy" which is a strategic communications document presented on the Army's official website. The "Strategy" is a discrete document that is prepared, approved, and presented as a stand-alone product. It is not fully linked to the Army aviation budget planning contained in Army aviation accounts in the Department's annual budget submission. The complete documentation that is submitted in support of the President's budget request is the Department's formal plan; the "Strategy" may include elements of a comprehensive strategy that were not funded, totally or partially, in the process of reconciling competing requirements to a constrained budget.

The Department's budget balances demands to field equipment quickly, ensure technology maturity, and properly mix the capabilities needed by the Services within the realism of the Administration's funding expectations. The Department's annual budget request addresses each of the considerations, and others as well, to include the war fighters' immediate needs. The Department's extensive budget preparation process and review is a best faith effort to consider and assess all the factors and to submit the best possible budget request. Furthermore, such assessments are revisited each year.

Attachment



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